IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB)
ISSN: 2455-264X, Volume 5, Issue 3 (May. – June. 2019), PP 56-59
www.iosrjournals.org

A Study of Thyroid Hormone Level in Pregnancy Induced Hypertension:

Dr. Asiya Naaz
Corresponding authors: Dr. Asiya Naaz

Date of Submission: 08-06-2019 Date of acceptance: 25-06-2019

I. Introduction

The term preeclampsia describes the development of hypertension >140/90 mmHg with proteinuria ≥ 300mg/24h after 20th week, of gestation. This disorder is unique to human pregnancy in which numerous genetic immunological and environmental factors interact. Therefore, it is a leading cause of maternal and fetal morbidity and mortality throughout the world and still is one of the most complex problem in obstetrics (2). It has long been recognized that maternal thyroid hormone excess or deficiency can influence maternal and fetal outcome at all stages of pregnancy. Although, pregnancy is usually associated with very mild hyperthyroxinemia, women complicated with preeclampsia have high incidence of hypothyroidism that might correlate with the severity of preeclampsia (3). The mechanism of hypothyroidism in preeclampsia has not been identified, but the changes in thyroid function during pregnancy are accounted for by high circulating estrogens (4).Maternal hypothyroidism is the most common disorder of thyroid function in pregnant women and is associated with pregnancy-induced hypertension, fetal mortality, placental abruption, preterm delivery, and reduced intellectual function in the offspring (5). These outcomes have been associated with both overt hypothyroidism (elevated serum TSH concentration and reduced free T4 concentration), that is found in about 0.2% of pregnant women, as well as subclinical hypothyroidism (elevated serum TSH and free T4 concentration) that is found in about 2.3% of pregnant women. Maternal overt hyperthyroidism (suppressed serum TSH and elevated serum free T3 and T4 concentration) is less common that affects approximately two of 1000 pregnant women (2). The aim of this study is comparison of serum levels of T3, T4 and TSH in preeclampsia and normal pregnancy.

II. Aims And Objectives

The present study was undertaken at Department of Biochemistry, SVS Medical College and Hospital, the following are aims.

A. To study the following parameters in antenatal women after 20 weeks of pregnancy :
1. Thyroid stimulating hormone(TSH)
2. Tri iodothyronine (T3)
3. Thyroxine (T4)

B. To find out any alterations in the above parameters in pregnancy induced hypertension.
C. To compare the above biochemical parameters between the test group and control group.
D. To correlate the outcome of pregnancy with the above biochemical parameters.

III. Materials

The present study is carried out in the Department Of Biochemistry, SVS Medical College Mahbubnagar. All the subjects included in the study are admitted in Department Of Obstetrics And Gynaecology, SVS Medical College Mahabubnagar . A total number of 20 normal antenatal women without PIH are included in control group and a total number of 20 diagnosed cases of PIH are taken as test group. The biochemical parameters of test group is estimated and compared with those of control group. The test group is selected on the basis of vital signs like blood pressure more than 140/90 mmHg and clinical features like oedema, headache, vomiting, epigastric pain, convulsions etc.

The following biochemical parameters are included in present study.
1. Thyroid stimulating hormone(TSH)
2. Triiodothyronine (T3)
3. Thyroxine (T4)

Cases-20 in number (test group)
Inclusion criteria:

1. Age - 1 8-35years.
2. Antenatal women with hypertension with or without proteinuria, pre-eclampsia and eclampsia.

Exclusion criteria
1. History of chronic hypertension before completion of 20 weeks of pregnancy
2. History of Diabetes

Control – 20 in number

Inclusion criteria :
1. Age group 18-35 years
2. Anetnatal women without hypertension/pre eclampsia/eclampsia.

Exclusion criteria
1. Patients with cardiovascular/rental/hepatic complications are excluded from the study.

IV. Method Of Collection Of Data

Case history and physical examination findings of both cases and controls are obtained.

ESTIMATION OF TRIODOTHYRONINE (T3) ENZYME IMMUNOASSAY TEST KIT

A. PRINCIPLE

In the T3 EIA, a second antibody (goat anti-must IgG) is coated on microtiter wells. A measured amount of patient serum, a certain amount of mouse monoclonal anti-T3 antibody,and constant amount of T3 conjugated with horseradish peroxidise are added to the microtitter wells. During incubation, the mouse anti-T3 antibody is bound to the second antibody on the wells, and T3 and conjugated 13 compete for the limited binding sites on the anti-T3 antibody. After 60 minute incubation at room temperature, the wells are washed 5 times by water to remove unbound T3 conjugate. A solution of TMB Reagent is then added and incubated for 20 minutes, resulting in the development of blue colour. The colour development is stopped with the addition of stop solution and the absorbance is measured spectrophotometrically at 450 nm. The intensity of the colour formed is proportional of the amount of enzyme present and is inversely related to the amount of unlabeled T3 standards assayed in the same way, the concentration. of T3 in the unknown sample is then calculated.The range in normal individuals is 0.6-1.85 mg/ml.

ESTIMATION OF TETRAIODOTHYRONINE(T_4)

A.PRINCIPLE

TOTAL T4 EIA TEST is one step assay for measurement of total thyroxine(T4) in human serum monoclonal anti bodies specific for T4 are immobilised on microwell plate. The lable used is T4 conjugated to horse radish peroxidas(HRT).In the assay T4 released from its binding proteins by ANS (8-anilino naphthalene-1sulphonic acid) present in the assay buffer. Total T4 in the specimen competes with HRP-labelled T4 for binding to the immobilised monoclonal antibody. After washing enzyme substrate is added.The amount of total T4 in the sample is inversely proportional to the enzyme activity.The reaction isterminated by adding stopping solution. Absorbance is measured on a microplate reader. EXPECTED VALUES FOR T4- The suggested normal range for Euthyroid thyroxine levels is 52-115.8 nmol/L or 4.0-12.0 mg/dl.

ESTIMATION OF TSH

A. Principle

TSH IEMA TEST is a two-step assay for the measurement of human TSH in serum.

An antibody specific for the b-chain of the human TSH molecule is immobilised on microwell plates and the antibodies of the TSH molecule are conjugated to horse radish peroxidise (HRP) TSH from the sample is bound to the plates. After a washing step HRP conjugate is added. After the second washing step substrate is added. The enzymatic reaction is proportional to the amount of TSH in the sample. The reaction is terminated, by adding stopping solution. Absorbance is measured on a microplate reader. EXPECTED VALUES FOR THE TSH is 0.3-6.0 ulU/ml.

V. Results

Table : 1

CONTROLS

S. No.	SYSTOLIC BP (mm Hg)	DIASTOLIC BP (mm Hg)	TSH 0.30-6.02µu/Dl	T4 4.8-11.6µU/dl	T3 0.52-1.90 ng/ml	GRAVID A
1	90	50	2.5	4.5	0.60	Multi
2	90	60	0.60	5.6	0.71	Primi
3	110	70	4.20	9.8	0.85	Multi
4	120	80	3.30	10.5	0.91	Multi
5	120	70	2.60	11.0	0.98	Primi
6	100	60	4.5	5.7	0.72	Primi
7	130	80	2.4	6.3	0.79	Multi

8	110	70	0.7	5.9	0.71	Primi
9	110	80	0.9	6.5	0.79	Multi
10	120	80	2.3	7.8	0.81	Multi
11	110	70	4.3	9.5	0.85	Multi
12	110	70	5.9	10.9	1.50	Primi
13	120	80	3.5	5.7	0.75	Multi
14	100	70	4.6	8.9	1.20	Primi
15	90	60	5.5	7.6	0.90	Multi
16	110	70	2.2	4.1	0.60	Primi
17	120	70	1.4	5.0	1.20	Multi
18	100	70	0.50	7.8	1.35	Multi
19	110	80	0.70	5.9	1.21	Primi
20	120	80	3.2	11.2	1.89	Primi
Total	2190	1420	55.8	150.2	4.83	
Mean	109.5	71.0	2.7900	7.560	0.966	
SD	11.46	8.52	1.67	2.229	0.33	

Table : 2

Cases

S. No.	SYSTOLIC BP (mm Hg)	DIASTOLIC BP (mm Hg)	TSH 0.30-6.02µu/Dl	T4 4.8-11.6µU/dl	T3 0.52-1.90 ng/ml	GRAVID A
1	150	100	7.5	5.5	0.91	Primi
2	160	100	7.9	6.3	1.20	Primi
3	160	110	8.2	8.5	1.35	Primi
4	140	100	6.9	4.9	0.60	Multi
5	140	100	7.1	5.2	0.80	Multi
6	170	120	8.5	9.5	1.50	Primi
7	150	110	4.5	13.3	1.95	Multi
8	150	110	6.7	7.2	1.39	Primi
9	150	110	7.4	6.2	1.42	Multi
10	150	110	7.8	6.1	1.40	Primi
11	160	100	8.3	7.1	1.30	Primi
12	150	110	7.5	5.4	1.25	Primi
13	170	110	8.9	8.9	1.49	Multi
14	140	110	6.5	10.5	1.70	Primi
15	180	130	9.2	4.9	0.60	Primi
16	140	100	6.6	9.6	1.52	Multi
17	140	110	5.5	12.9	1.75	Primi
18	150	100	6.1	15.3	2.01	Multi
19	160	110	8.4	10.5	1.72	Primi
20	170	110	8.9	5.1	0.30	Multi
Total	3080	1420	148.4	162.9	6.54	
Mean	154	71.0	7.420	8.145	1.308	
SD	11.87	8.52	1.21	3.10	0.45	

TABLE -III

S. No.	Investigations	Values	Controls	MI Cases
1	Systolic Blood Pressure (mmHg)	Mean	109.5	154
		SD	11.46	11.88
		SEM	2.56	2.66
		t-test	12.05	
		p-Value	<0.0001	
			Control Subjects	Test Group
2	Diastolic Blood Pressure (mmHg)	Mean	71.0	107.5
		SD	8.52	7.86
		SEM	1.9051	1.7575
		t-test	14.08	
		p-Value	<0.0001	
			Control Subjects	**Test Group**
3	Thyroid Stimulating hormone (TSH)	Mean	2.79	7.42
		SD	1.67	1.21
		SEM	0.37	0.27
		t-test	4.63	
		p-Value	0.0001	
			Control Subjects	**Test Group**
4	Thyroxine (T4)	Mean	7.56	8.14
		SD	2.29	3.10
		SEM	0.69	0.51
		t-test	0.67	

		p-Value	0.5	

			Control Subjects	**Test Group**
5	Tri iodothyronine (T3)	Mean	0.966	1.30
		SD	0.33	0.45
		SEM	0.07	0.10
		t-test	2.69	
		p-Value	0.01	

SD : Standard Deviation
Sem : Standard Error of Mean

VI. Discussion

Preeclampsia is a serious complication of pregnancy with unknown etiology that may occur at any stage of second or third trimester. Although it is defined in terms of hypertension and proteinuria, it can affect other maternal systems, so the presentation and progression of this disease are variable. Furthermore, the treatment of this disorder has not significantly changed from 50 years ago so far. However, the cause of preeclampsia has remained unknown, but the condition has been reported to be correlated with deficient intravascular production of prostacyclin, a vasodilator, and excessive production of thromboxane, a platelet-derived vasoconstrictor and stimulant of platelet aggregation.

The endothelial cell dysfunction plays an important role in the pathogenesis of preeclampsia. Modest decreases in thyroid hormones along with increased TSH level in maternal serum are correlated with severity of preeclampsia and high levels of endothelin. Reduced serum concentration of T3 and T4 may also be explained by the faulty estrogen production due to placental dysfunction in preeclampsia. The results of the present study suggest that the levels of T3, T4 are statistically significant and TSH is not statistically significantly between preeclampsia and normal pregnancy.

However with regard to the results of the present study, the measurement of serum levels of T3,T4 and TSH can not be suggested as a criterion for diagnosing preeclampsia. These findings do not support the hypothesis that changes in FT3, FT4 and TSH levels could be possible etiology of ,preeclampsia.

VII. Conclusion

A comparative study was done between a normal pregnant women and women with PII-I on the levels of T3, T4 and TSH in serum sample. The patients were clinically diagnosed based upon history, clinical symptoms, sigris and levels of blood pressure.

In all the blood samples obtained from controls and case T3,. T4 and TSH were estimated by standard methods.

For this study the results showed a .slight significant rise in TSH levels. Whereas no significant change in levels of T3 and T4 in cases with PIH. But in the control subjects the values for all above parameters are within normal limits.

From this study it is concluded that estimation of these biochemical parameters plays an important role in the diagnosis of PIH and the evaluation of risk factors, early detection and effective antenatal services, prompt and proper management will decrease the materno-foetal mortality, morbidity and also perinatal mortality.

Bibliography

[1]. .Cunninghams FG,MacDonald PC & Gant NF (1989).Hypertensive Disorders in pregnancy.In: Cunninghams FG,MacDonald PC & Gant NF (editors).Williams obstetrics.prentice-Hall,Norwalk,653-694
[2]. J.G.L.Ramos,S.H.Martins-costa.J.B.Kessler,C.A.Costa and E.Borros.calciuria and preeclampsia.Braz J Med Biol Res.1998, 31(4) 519-522
[3]. D.C.DuttaText book of obstetrics;6th edition.
[4]. Williams Obstetrics;Cunninghams F,Gray;4th edition.
[5]. Audrey F saftlas Am J obstetrics And Gynaecology 1990;163-460, Darnforth editor obstetrics And Gynaecology(1999),lippincott Williams and Wilkins,New York, 309-327.

Dr. Asiya Naaz. " A Study of Thyroid Hormone Level in Pregnancy Induced Hypertension: " IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB) 5.3 (2019): 56-59.